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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,849	11/07/2001	William A. Treece	18897-284797	8967

7590 11/25/2003

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EXAMINER	
CUEVAS, PEDRO J	
ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 11/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No.	Applicant(s)	
	10/006,849	TREECE, WILLIAM A.	
	Examiner	Art Unit	
	Pedro J. Cuevas	2834	

-- The MAILING DATE of this communication appears on the cov r sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

2. Claim 5 is objected to because of the following informalities: the expression "to break resistor to break power" seems to be a typographical error. Appropriate correction is requested.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1, 5, 9, 14-15, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,781 to Hsu et al. in view of U.S. Patent No. 4,988,283 to Nagasawa et al.

Hsu et al. clearly teaches the construction of an electrochemical converter having internal thermal integration comprising:

a shaft;

a generator (84) coupled to the shaft, to generate AC power, which can operate as a motor to drive the shaft;

a compressor (76) coupled to the shaft, to receive a supply of air having one or more contaminates, said compressor to provide a supply of compressed air;

a combustor (104) coupled to receive the supply of compressed air and a supply of fuel, said combustor to combust the supply of fuel and to provide a unit of exhaust gas;

a turbine (80) coupled to the shaft and coupled to receive the exhaust gas, said unit of exhaust gas to flow through the turbine to rotate the shaft; and

a fuel cell module (72) coupled to receive the unit of exhaust gas at an inlet port, and coupled to receive an additional supply of fuel, said fuel cell module to heat the unit of exhaust gas to a temperature that is greater than a temperature at the inlet port and provide the exhaust gas at a fuel cell outlet port, said fuel cell module to generate an output voltage on a voltage line.

However, it fails to disclose a power controller electrically coupled to the generator, said power controller including a power converter to convert said AC power to DC power on a DC bus for providing power to a load, said power controller to regulate the flow of the unit of exhaust gas to the fuel cell module, independent of the DC power on the DC bus.

Nagasawa et al. teach the construction of fuel cell power generating apparatus and method for controlling the apparatus comprising:

a power controller (1c and 12c) electrically coupled to the generator, including a power converter (22) to convert said AC power to DC power on a DC bus for providing power to a load, said power controller:

regulates the flow of the unit of exhaust gas to the fuel cell module, independent of the DC power on the DC bus; and

isolates the AC power from the DC bus and couples the output voltage on the voltage line to the DC bus for providing power to the load;

a break resistor (31C) controllably coupled to the DC bus, to break resistor to sink power from the DC bus under control of the power controller;

a fuel controller (3) for providing the supply of fuel to the combustor (5) under control of the power controller, and an additional fuel controller to supply the additional fuel supply to the fuel cell module under control of the power controller;

for the purpose of controlling a generating apparatus in which the power of a fuel cell can be controlled in proportion to changes in electric power load and a method for controlling the same.

It would have been obvious to one skilled in the art at the time the invention was made to use the fuel cell power generating apparatus and method for controlling the apparatus disclosed by Nagasawa et al. on the an electrochemical converter having internal thermal integration disclosed by Hsu et al. for the purpose of controlling a generating apparatus in which the power of a fuel cell can be controlled in proportion to changes in electric power load and a method for controlling the same.

5. Claims 2, 21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,781 to Hsu et al. in view of U.S. Patent No. 4,988,283 to Nagasawa et al. as applied to claim 1, 5, 9, 14-15 above, and further in view of U.S. Patent No. 5,995,396 to Byrne et al.

Hsu et al. in view of Nagasawa et al. disclose the construction of a fuel cell power generating apparatus and electrochemical converter having internal thermal integration as described above.

However, it fails to disclose a DC/DC converter to controllably couple the voltage line to DC bus under control of the power controller.

Byrne et al. teach the construction of a hybrid standby power system comprising a DC/DC converter (630) to controllably couple the voltage line to DC bus under control of the power controller for the purpose of converting unregulated DC electrical power into regulated DC electrical power.

It would have been obvious to one skilled in the art at the time the invention was made to use the hybrid standby power system disclosed by Byrne et al. on the fuel cell power generating apparatus and electrochemical converter having internal thermal integration disclosed by Hsu et al. in view of Nagasawa et al. for the purpose of converting unregulated DC electrical power into regulated DC electrical power.

6. Claims 3-4, 6-8, 10-13, 16, 19, 22-23, and 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,781 to Hsu et al. in view of U.S. Patent No. 4,988,283 to Nagasawa et al. as applied to claims 1, 5, 9, 14-15 above, and further in view of U.S. Patent No. 5,968,680 to Wolfe et al.

Hsu et al. in view of Nagasawa et al. disclose the construction of a fuel cell power generating apparatus and electrochemical converter having internal thermal integration as described above.

However, it fails to disclose:

> an additional converter coupled between the DC bus and the load, said additional converter to convert the DC power on the DC bus to an AC power having a fixed frequency;

a recuperator having a high-pressure side and a low-pressure side, said supply of compressed air flowing through said high-pressure side, and said exhaust gas flowing through the low-pressure side; and

a temperature sensor coupled to the turbine to sense a temperature, said sensor coupled to the power controller, said power controller to vary the supply of fuel to the combustor to control the temperature, said control of the temperature being independent of the DC power on the DC bus.

Wolfe et al. teach the construction of a hybrid electrical power system comprising:

an additional converter (34) coupled between the DC bus and the load, said load being a power grid, said additional converter to convert the DC power on the DC bus to an AC power having a fixed frequency;

a recuperator (48) having a high-pressure side and a low-pressure side, said supply of compressed air flowing through said high-pressure side, and said exhaust gas flowing through the low-pressure side (Figure 1 airflow arrows); and

a temperature sensor (38) coupled to the turbine to sense a temperature, said sensor coupled to the power controller, said power controller to vary the supply of fuel to the combustor to control the temperature, said control of the temperature being independent of the DC power on the DC bus;

for the purpose of providing an electrical power system, which utilizes the exhaust air and un-reacted fuel wasted from the solid oxide fuel cell.

It would have been obvious to one skilled in the art at the time the invention was made to use the hybrid electrical power system disclosed by Wolfe et al. on the fuel cell power generating

apparatus and electrochemical converter having internal thermal integration disclosed by Hsu et al. in view of Nagasawa et al. for the purpose of providing an electrical power system, which utilizes the exhaust air and un-reacted fuel wasted from the solid oxide fuel cell.

7. With regards to claims 11-13, 17-19, and 29-33, Hsu et al. in view of Nagasawa et al. further in view of Wolfe et al., disclose a system in which:

the fuel cell module can be positioned between the turbine and the low-pressure side of the recuperator, or at an outlet port of the low-pressure side of the recuperator;

the fuel cell module comprises one of the following modules: solid oxide fuel cell ("SOFC") module, molten carbonate fuel cell ("MCFC") module, direct methanol fuel cell ("DMFC") module, proton exchange membrane fuel cell ('/PEMFC') module, phosphoric acid fuel cell ("PAFC") module, and alkaline fuel cell ("AFC") module;

heat generated by the fuel cell module neutralizes at least one of the one or more contaminates; and

the fuel cell module heats said unit of exhaust gas to a temperature of at least 1,500 degrees Fahrenheit.

8. Claims 6-8 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,501,781 to Hsu et al. in view of U.S. Patent No. 4,988,283 to Nagasawa et al. further in view of U.S. Patent No. 5,968,680 to Wolfe et al. as applied to claims 3-4, 6-8, 10-13, 16, 19, 22-23, and 27-33 above, and further in view of U.S. Patent No. 5,995,396 to Byrne et al.

Hsu et al. in view of Nagasawa et al. further in view of Wolfe et al. disclose the construction of a fuel cell hybrid power generating apparatus and electrochemical converter having internal thermal integration as described above.

However, it fails to disclose an energy reservoir controllably coupled to the DC bus via an energy converter under control of the power controller.

Byrne et al. teach the construction of a hybrid standby power system comprising an energy reservoir (flywheel system 240) controllably coupled to the DC bus via an energy converter under control of the power controller for the purpose of converting unregulated DC electrical power into regulated DC electrical power.

It would have been obvious to one skilled in the art at the time the invention was made to use the a hybrid standby power system disclosed by Byrne et al. on the fuel cell hybrid power generating apparatus and electrochemical converter having internal thermal integration disclosed by Hsu et al. in view of Nagasawa et al. further in view of Wolfe et al. for the purpose of converting unregulated DC electrical power into regulated DC electrical power.

9. With regards to claims 8 and 24, Hsu et al. in view of Nagasawa et al. in view of Wolfe et al. further in view of Byrne et al. disclose a system in which the generator is a motor/generator and said power converter and said additional power converter are bi-directional, said power controller to direct the power converter and one of said energy converter and said additional converter to provide power to the motor/generator at startup.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pedro J. Cuevas whose telephone number is (703) 308-4904. The examiner can normally be reached on M-F from 8:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R. Ramírez can be reached on (703) 308-1371. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Pedro J. Cuevas
November 13, 2003

BURTON S. MULLINS
PRIMARY EXAMINER